



from **SPARTAN BOOKS**
NEW PUBLICATIONS
ON THE INFORMATION PROCESSING SCIENCES

TOWARD A NATIONAL INFORMATION SYSTEM

Edited by
MORRIS RUBINOFF

TOWARD A NATIONAL INFORMATION SYSTEM is the theme of this volume representing the proceedings of the Second Annual National Colloquium on Information Retrieval held in Philadelphia. Edited by Dr. Morris Rubinoff of the Moore School of Electrical Engineering of the University of Pennsylvania, the book acknowledges the strong impetus toward a national information system and brings together here many of the divergent and convergent viewpoints and developments.

■ Paced by Congressman Roman C. Pucinski expounding on the bill, H.R. 664, "A National Research Data Processing and Information Retrieval System," participants in the conference lent their expertise from professional societies, industry, government and educational institutions. The resulting papers represent an up-to-date report on what seems to be a necessary and attainable goal.

■ Steps in this direction have already been taken by, for example, the Weinberg Report, the Stanford Research Institute 5-Point Program, the Pucinski Plan, and by the President's Science Advisory Committee (PSAC) and the Committee on Science and Technical Information (COSATI). The papers here presented discuss the role of the engineering societies in a national information system, the economics of such a system, the place of research libraries, and a national registry system for chemical compounds.

■ Also covered are the contributing factors of man-computer interaction, administration, retrieval center-normal text techniques and natural language processing.

■ As an indication of the progress "toward a national information system," the text of Public Law 89-182 is included as Appendix II. Passed by the 89th Congress on September 14, 1965, this Act is designed "To promote commerce and encourage economic growth by supporting State and Interstate programs to place the findings of science usefully in the hands of American enterprise."

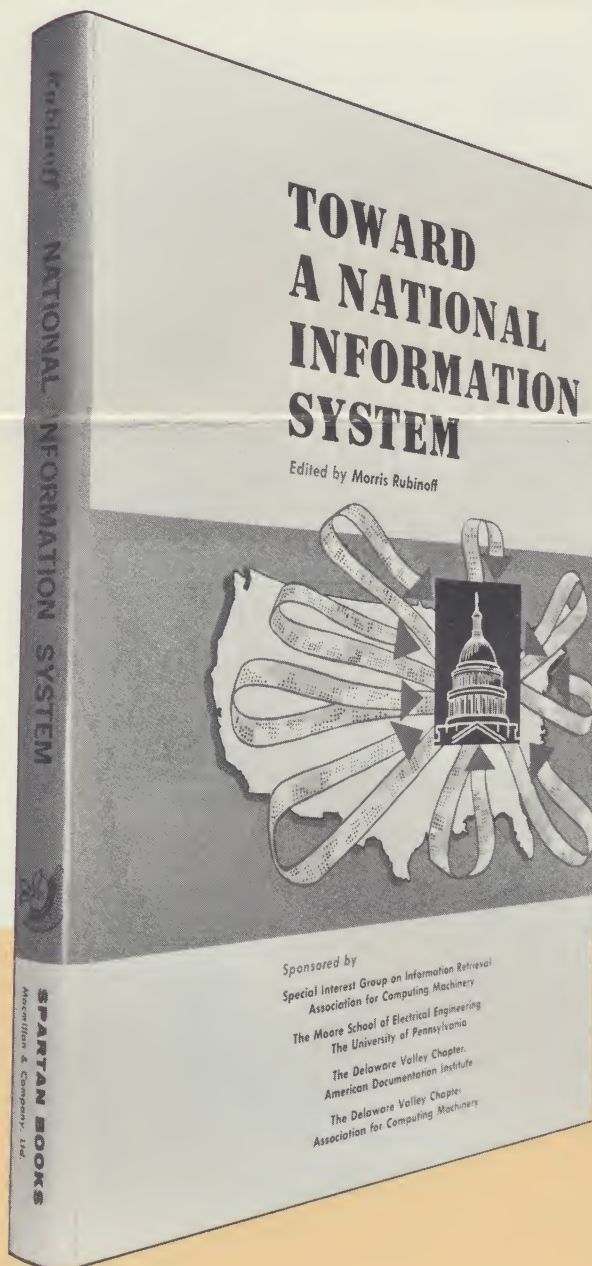
There has been substantial impetus toward a national information system to handle the ever-increasing number of scientific and technical publications. Plans are being developed and action is being instituted by the professional societies community, by the military and by the civilian government. The many divergent and convergent viewpoints and developments to date were presented in open forum at this Colloquium. Key members of industry, professional societies, educational institutions, the library community and government participated. The Proceedings incorporate all the papers presented at the Colloquium.

THE EDITOR

IBM No. 9051 6 X 9 illus. 250 pages \$9.50

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The Convergence of the Spearheads by Col. Andrew A. Aines; **A National Research Data Processing and Information Retrieval System** by Hon. Roman C. Pucinski; **The Clearinghouse for Federal Scientific and Technical Information** by Donald A. Schon; **The Role of the Engineering Societies in the National Information System** by Norman E. Cottrell; **Reliability Central Data Management System** by Alan R. Barnum; **Man-Computer Interaction in Information Systems** by J. C. R. Licklider; **Medlars: Progress and Prospects** by Scott Adams; **The Information and Data Exchange Experimental Activities (IDEA) Program and Its Relation to the National Interests** by Allen Hoffman; **Communications and Information Retrieval** by Joseph M. Wier; **Administration of Information Analysis Centers** by G. S. Simpson, Jr.; **Application of Basic Principles in the Design and Operation of a Large Information System** by Melvin S. Day; **The Economics of a National Information System** by John S. Sayer; **Research Libraries in Information Networks** by Frederick G. Kilgour; **Progress in the Development of a Generalized Information Retrieval System at ASM** by Clayton A. Shepherd; **National Registry System for Chemical Compounds** by Fred A. Tate; **North American Aviation's National Operating System** by J. L. Ebersole; **IBM Technical Information Retrieval Center—Normal Text Techniques** by Joseph J. Magnino, Jr.; **Natural Language Processing and the Time-Shared Computer** by R. F. Simmons.

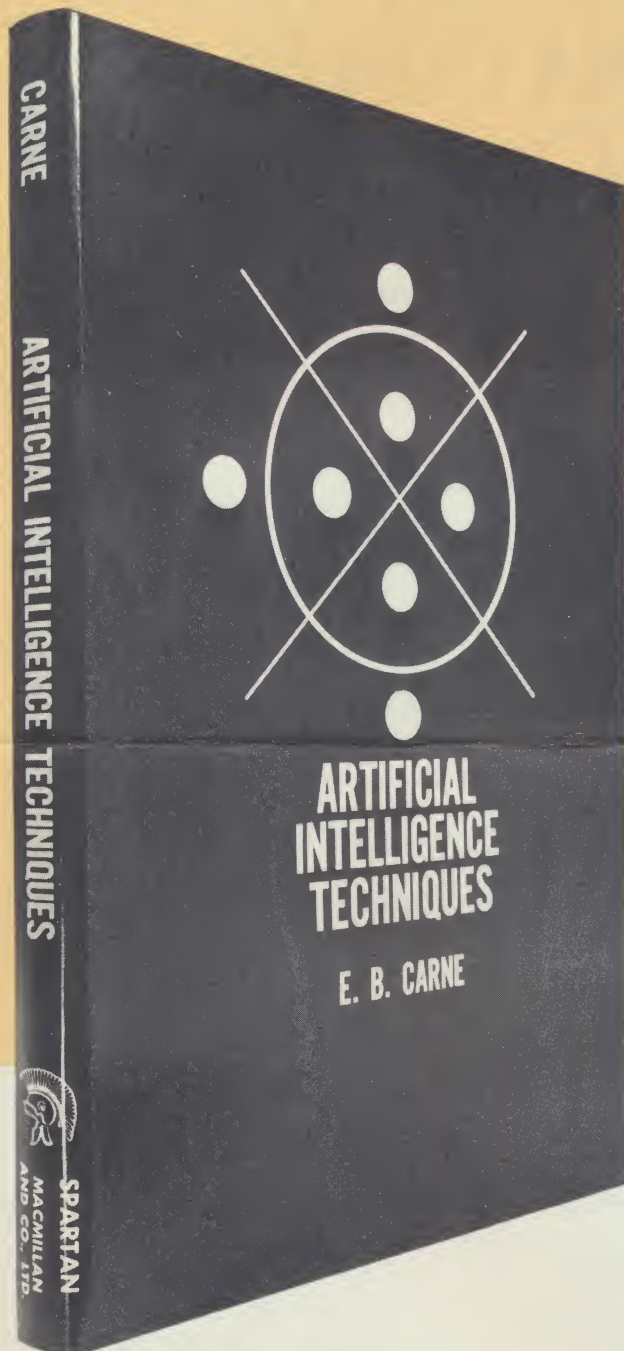


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FOR INFORMATION PROCESSING SCIENTISTS

by E. B. CARNE

ARTIFICIAL INTELLIGENCE TECHNIQUES



IBM No. 9063 6 X 9 illus.
160 pages \$7.25

ARTIFICIAL INTELLIGENCE is part of the new and rapidly expanding field of bionics, which seeks to apply biological principles to the design of electronic systems in order to produce equipment which simulates facets of the behavior of intelligent organisms. In its application to learning, efforts are being made to achieve a similar function in an electronic system, thus opening the way to development of devices which can relieve humans of arduous analytical and arithmetic tasks.

The author, Dr. E. B. Carne, obtained his Ph.D. in Electrical Engineering from the University of London; he has long been engaged in the design and development of computer components and computer-controlled systems. His book is a guide to electronic techniques which can be used to simulate intelligence. It describes the central nervous system, discusses the major approaches to neuron modelling and describes the organization of a simple learning system.

The second part of the book applies the learning techniques to pattern recognition, discusses heuristic programming and presents methods for improving the reliability of logical systems.

DR. CARNE has attempted to present the practical aspects of learning machines to the engineer who is interested in logic and computers. Here is a volume which faces the real problems of probing the workings of the human system; it concentrates on *breadboard* rather than *black-board*.

CONTENTS:

- **INTRODUCTION**, Intelligence and Learning, The Nervous System, The Sensory Organs, Organization, Memory.
- **NEURON MODELS**, Formal Neuron, Automation, Adaptive Linear Neuron, Perceptron, Membrane Models, Neuristor, Transistor Models, Multi-Aperture Magnetic Core Neuron, Binary Logical Element, Conditional Probability Computer.
- **SIMPLE LEARNING SYSTEM**, Learning Network, Goal Network, Reinforcement, Rote Learning.
- **PATTERN RECOGNITION**, Chrysler Optical Processing Scanner, Frog's Retina, RCA Phonetic Typewriter, Artificial Sensors, Statistical Decision Models, Pandemonium, Random Features, Threshold Devices, Prediction, Ideal Pattern Recognizer.
- **PROGRAMMING**, Assemblers and Compilers, Heuristic Techniques, Tic-Tac-Toe, Checkers, Chess and Other Topics, General Problem Solver.
- **RELIABLE NETWORKS**, Von Neumann's Bundles, Self-Repair.
- **CONCLUSION**
- **INDEX**



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Fundamentals of DISPLAY SYSTEMS

by HARRY H. POOLE

A STUDY IN DISPLAY GENERATION . . .

■ This book provides a broad study of the techniques which are used in generating displays. It includes not only the display devices themselves but also display system considerations and related en-

gineering areas. Special emphasis is given to television, radar and computer generated displays. The book concludes with a discussion of the most promising techniques which are still in the research stage.

CONTENTS:

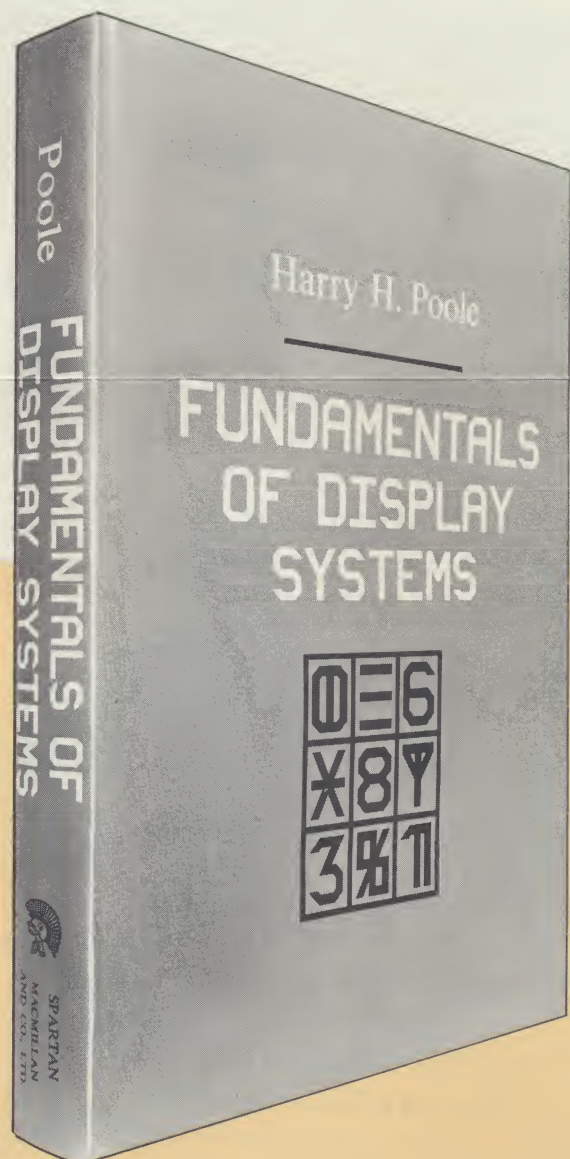
■ The first two sections cover techniques which can be used in generation displays. The scope is in breadth rather than depth, with the majority of display techniques available covered. The third part of the book covers system design considerations, with special emphasis on television, radar and computer systems. Part four is a detailed discussion of three engineering areas related to the display field. The significance of this section is that the topics are covered from a display designers point of view. Part five is a discussion of the most promising techniques which are still in the research stage, and a summary of the present state of the display art. The text is augmented by four appendixes: Commercial Television Standards; Glossary; Nomenclature and Bibliography.

SPECIFIC HEADINGS:

■ Cathode Ray Tube Techniques—The Basic Cathode Ray Tube, Special Purpose Cathode Ray Tubes, Color Cathode Ray Tubes, Color by External Methods, Environmental Considerations; Other Display Techniques—Large Screen Projection Techniques, Large Screen Discrete Techniques, Individual Display Units, Display Peripheral Devices; Display Systems—Introduction to the Display System, Television Systems, Radar Systems, Computer Generated Systems, Miscellaneous Applications; Related Areas—Human Engineering Considerations, Optics, Luminescences; Future Display Techniques—Present State of the Art, New Techniques.

ABOUT THE AUTHOR, HARRY H. POOLE

Graduate of Vanderbilt University, 1954 BA in Physics. Present position: Senior Development Engineer—Honeywell, Inc. Responsible for both the analysis and design of computer-display systems in the areas of Command and Control and Navigation & Guidance.



IBM No. 9065 6 X 9 illus. 416 pages \$20.00

TECHNICAL INFORMATION CENTER ADMINISTRATION

Edited by ARTHUR W. ELIAS

TICA 2

This volume, one of the Drexel Information Science Series, is a report of the proceedings of the second conference on Technical Information Center Administration. Following the success of TICA 1, this meeting drew participants from as far west as California to its site among the rolling hills of Pennsylvania. The broad range of interest is accurately reflected in these papers which make up the second book.

Indeed, TICA 2 stands independently as a source of valuable information to the inquirer into the new field of information science as well as a report on latest developments to those who have followed it since its inception. Drawing on the skill and knowledge of authorities from industry, government and academia, the Editor, Arthur W. Elias, has compiled a blend of practical and theoretical ingredients, valuable at all levels of experience and understanding.

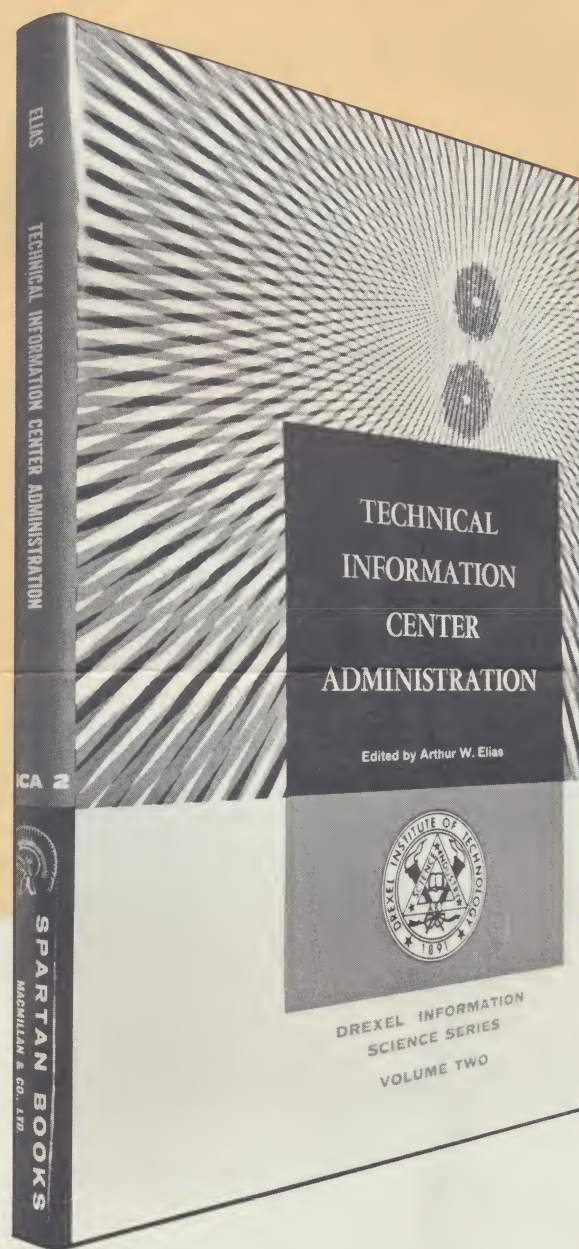
The comprehensive coverage of Technical Information Center applications includes:

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CONTENTS:

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- Document Storage and Handling in Information Systems
- The Library and the Technical Information Center
- Chemical Information in the Technical Information Center
- Data Handling Systems
- The Control of Quality or Back to Quality, Not Forward to Cutter
- User Education
- The Technical Information Center Manager/Administrator
- The Evaluation of Retrieval Systems
- Goals for Technical Information Centers
- The Giant Mechanical Brain in the smiling, crew-cut skull



IBM No. 9050 6 X 9 illus. 175 pages \$6.75

TICA 1 TECHNICAL INFORMATION CENTER ADMINISTRATION

IBM No. 9011 6 X 9 illus. 171 pages \$6.75

Edited by A. W. ELIAS,

Drexel Information Science Center Vol. 1, 171 pages, 6x9 illus., (1964) Order No. 9011 \$6.75

Both volumes of Technical Information Center Administration provide the proceedings of conferences on the subject held under the auspices of Drexel Institute of Technology. They provide an up-to-the minute review of the functions of a technical information center. Each paper was written by an authority in the information science field.

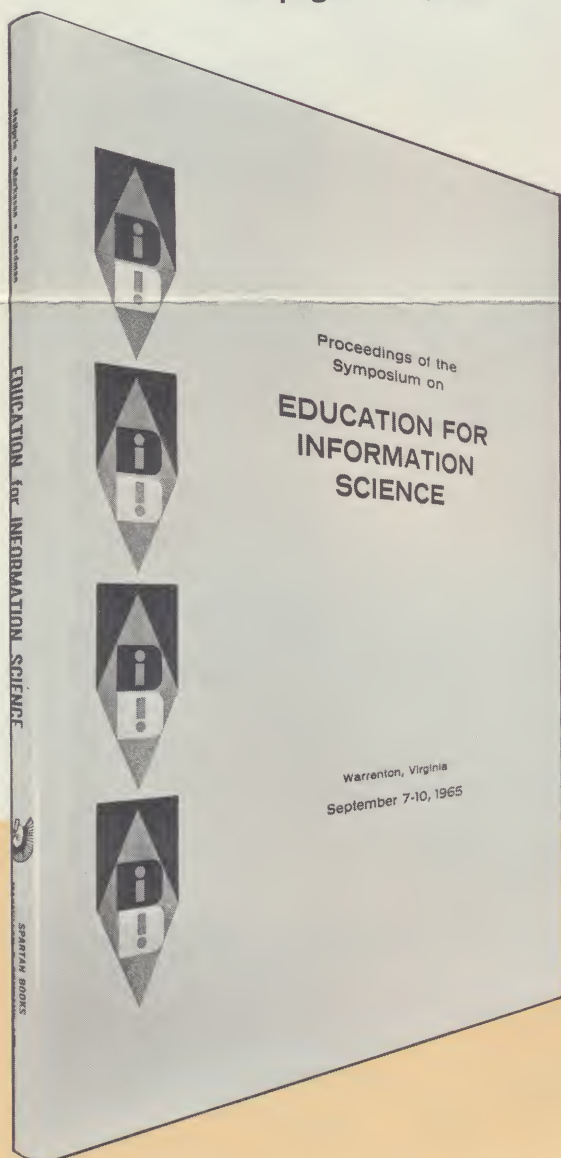
PROCEEDINGS OF THE SYMPOSIUM ON EDUCATION FOR INFORMATION SCIENCE

Warrenton, Virginia—September 7-10, 1965

Edited by LAURENCE B. HEILPRIN / BARBARA E. MARKUSON / FREDERICK L. GOODMAN

PROCEEDINGS OF THE SYMPOSIUM ON EDUCATION FOR INFORMATION SCIENCE Five separate sessions of panel discussions were held at this symposium, as well as additional special presentations. Since the reports by these panels were written simultaneously, they represent five independent group views of the conference.

IBM No. 9100 8½ X 11 illus.
190 pages \$6.00



CONTENTS:

CONTRIBUTIONS TOWARD INFORMATION SCIENCE THEORY

- Misplaced Analogy: A Rebuttal of the Proposed Relation between Information Retrieval and Education
- "Use" and "Mention" in the Information Sciences
- Analogy between Information Retrieval and Education
- Information Retrieval as a Receiver-Controlled Communication System
- The Individual and Political Life of Information Systems

OPERATIONAL CONSTRAINTS IN DESIGN OF INFORMATION SCIENCE SYSTEMS

- Allocation of Information Resources; Implications for Education
- Browsability in Modern Information Retrieval Systems
- Human Intellect and the Development of Library Systems

PEDAGOGICAL ASPECTS

- Some Suggestions Concerning Teaching and Research in the Information Sciences
- The New Master of Science Degree in Information Science (Documentation) to be Given by the School of Library Service, UCLA
- The Role of Mathematics and Logic in the Information Sciences Curriculum
- The Art of Teaching Information Science
- Toward an Educational Base for the Information Sciences and Information Engineering

ADMINISTRATIVE PROBLEMS

- COSATI Panel on Education and Training
- Administration of a University Documentation Center
- On the Nature of Information Science and the Responsibility of Institutions of Higher Education
- A University Course on Information Retrieval Theory

COMPUTER SCIENCE IN THE INFORMATION SCIENCES CURRICULUM

- Some Reflections on the Relation between Information Science and Digital Processors
- Education Toward Research in Machine-Based Information Systems
- Applied Mathematics and Information Science
- Curricular Aspects of the Systems Concept
- Some Comments on the Organization of Men, Machines, and Concepts
- The Activity Spectrum: A Tool for Analyzing Information Systems

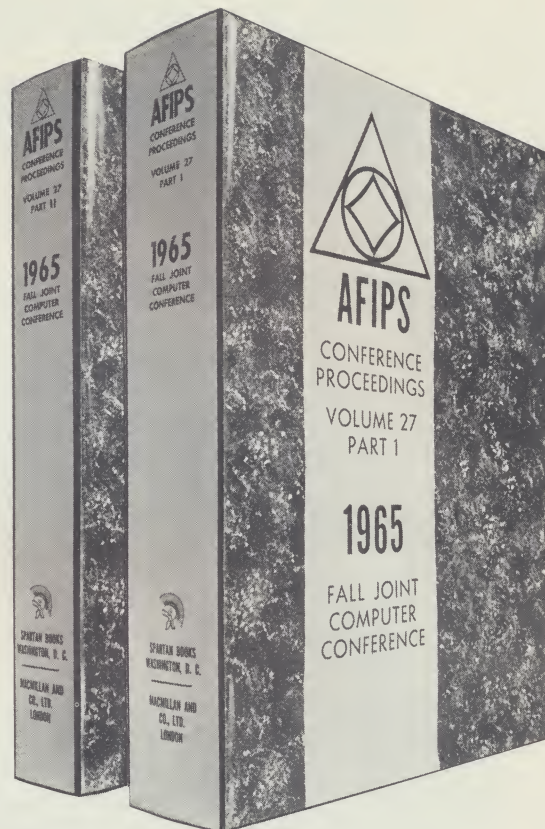


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AFIPS

CONFERENCE PROCEEDINGS VOLUME 27, PART I AND II 1965 JOINT COMPUTER CONFERENCE

HERE IS THE LATEST addition to this outstanding series of large, double-column, information-crammed volumes published by Spartan twice a year immediately prior to the Spring and Fall Joint Computer Conferences of the American Federation of Information Processing Societies. Each volume provides a permanent record of the work and transactions of the Technical Program sponsored by AFIPS, and is thus an invaluable reference source and summary of much of the literature. The large number of papers in each volume, all written by experts in their respective fields, encompasses a broad cross section of computer-science and technology.



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- SIMULATION OF HUMAN BEHAVIOR

AFIPS Volume 27 Part II is the post-conference section of the Proceedings of the Fall Joint Computer Conference of 1965. It will be approximately one-half the size of Part I, and availability is estimated to be late July.



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"THE TECHNOLOGY OF MANAGEMENT" SERIES

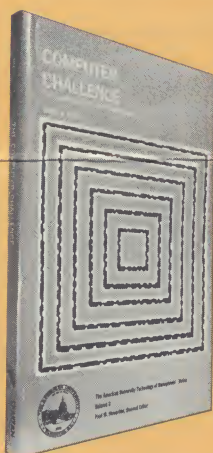
SPONSORED BY THE CENTER FOR TECHNOLOGY AND ADMINISTRATION OF THE AMERICAN UNIVERSITY



INFORMATION SYSTEMS COMPATIBILITY

Edited by SIMON M. NEWMAN, Professor, American University

Although much has been done in the computer field to make retrieval of technical and scientific information as simple as possible, little attention has been given the potentialities of the interaction of these systems. The opinions of documentalists, scope of the problem, programs now in operation and proposed programs are studied in depth in this volume.



COMPUTER CHALLENGE TO URBAN PLANNERS AND STATE ADMINISTRATORS

By HARRY H. FITE, manager, state and local government marketing,
UNIVAC Division, Sperry Rand Corp.

This is a valuable collection of the speeches and articles by Harry H. Fite about the uses and potentialities of computers in state and local government. The theme of the book is that the period of real growth and significance in computer use lies ahead if officials recognize the possibilities for their use in the substantive—particularly planning—aspects of government although heretofore they have been applied mainly to housekeeping chores in administration.



AUTOMATION AND ELECTRONICS IN PUBLISHING

Edited by LOWELL HATTERY and GEORGE BUSH

Publishing and printing are at an evolutionary turning point, owing primarily to certain basic research in electronics and chemistry and to unique development into useful technological applications. Thus, printing has become cheaper, faster, and less dependent upon craftsmanship. Concurrently, it requires more sophisticated apparatus and human beings. As a consequence there are the inevitable changes both in obsolete machines, displaced workers, and peripheral readjustments in the industry. The trend is toward even more of the same because much so-called "fallout" from huge governmental basic research and development projects lies still unexploited.

This book is derived from a symposium sponsored by the Center for Technology and Administration of The American University, which explored the electronic printing automation problem, its varied technologies, viewpoints, proposed solutions, and outlook. In addition to reporting the symposium, the book includes a summary chapter and a selected bibliography of items.

SPARTAN BOOKS, *Division of Books, Inc., 432 Park Avenue South, New York, N.Y. 10016*

INFORMATION SYSTEMS COMPATIBILITY

Edited by

SIMON M. NEWMAN

Many system models have been constructed as a result of the great attention being paid to the control of scientific and technical information so that retrieval of this information is simple, complete and relevant. Unfortunately, little attention has been directed to the interaction of these systems. This volume consolidates the opinions of a distinguished group of documentalists on the dimensions of the problem, the programs now focused on achieving compatibility, the authority files, indexing languages, and the standards being proposed to bring order to this important aspect of the storage and retrieval of scientific and technical information.

IBM No. 9062 6 X 9 illus. 184 pages \$7.50

VOL. 1 OF THE TECHNOLOGY OF MANAGEMENT SERIES

The Center for Technology and Administration of The American University introduces, with this volume, its Technology of Management Series. Under the general editorship of Paul W. Howerton, Director, the series is designed to present the thinking of the leading practitioners in the information sciences.

Volume 1, edited by Simon M. Newman, Professorial Lecturer at the University, is based on papers given at the Sixth Institute on Information Storage and Retrieval held at the Center. The theme was Systems Compatibility for Scientific and Technical Information. The proliferation of special libraries and information systems has created problems and unique situations which have resulted in divergent methods of performing the same processes and subprocesses. This book attempts to show the ways of achieving cooperation among associated organizations.

The principal concepts around which the chapters were planned may be summed up as Compatibility, Convertibility, Cooperation and Standardization. The diversified coverage is illustrated by the division of the book into:

- PART I. Requirements and Problems
- PART II. Programs to Achieve Compatibility
- PART III. Thesauri, Dictionaries, and Word Lists
- PART IV. Indexing Languages and Mechanisms



CONTENTS

(abridged): Federal Government Activities in Scientific and Technical Information by Lt. Gen. W. J. Ely; Perspectives to 1980: Our Immediate International Future, by Dr. Karl F. Heumann; Alliston Information Retrieval System by Lester A. Roubush; Technical Documentation Center by Bernard M. Fry; Programs to Achieve Compatibility by Dr. R. B. Stegmaier, Jr.; Organic and Functional Concepts of Authority Files by Paul W. Howerton; Links and Roles by Bart E. Holm; Other Mechanisms for Indexing Language Control by Lea M. Bohnert; Research in Mechanized Systems by Dr. Martin L. Ernst; A Review of Programs to Achieve Information Center Compatibility by Dr. Mortimer Taube.



SPARTAN BOOKS

THE COMPUTER CHALLENGE

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and
STATE ADMINISTRATORS

By HARRY H. FITE

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*specifically created to inform municipal and state
officials of the valuable asset of computerized city
and state planning.*

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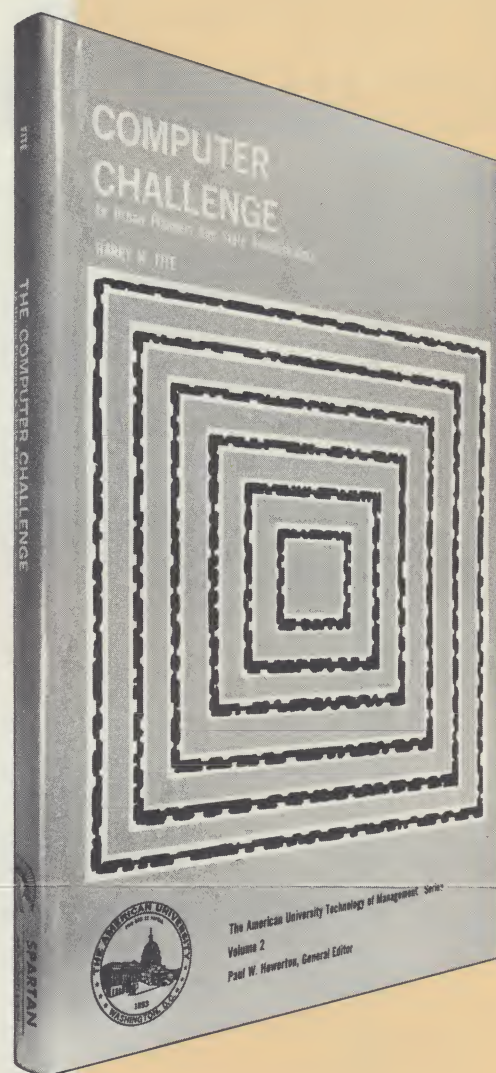
VOL. 2 OF THE TECHNOLOGY OF MANAGEMENT SERIES

This is the second volume in the new American University Technology of Management Series. It concerns itself with the current and ever-present problems facing local and state officials in handling urban planning and the role and potentialities of the computer in solving these problems. The author is Harry H. Fite, the Manager of State and Local Government Marketing for the UNIVAC Division of Sperry Rand. He is presenting the results of his experience and research, as given at meetings and conferences of local government officials, relating to the awakening need for computers in the public sector of human affairs.

The articles were written and given to government top managers and designed to alert them to the fact that the growth of computer technology is of vital importance and usefulness to them.

Some of the topics covered are:

- Automation and Management Education
- Sounder Decisions in City Government
- Municipal Process Control
- Centralized Computer Traffic Control
- Evolution of ADP in State Government
- Automation of a State Revenue Department



CONTENTS:

The Computer Challenge to State and Local Government, Computers, Technology and Government, World Automation and Management Education, The Future: Big Enough for Man And Computer, Sounder Decisions in City Government Through Computers, Automation's New Frontier; Municipal Process Control, Centralized Computer Traffic Control, Computer Traffic Control for Smaller Cities, Administrative Evolution of ADP in State Government, Automation of a State Revenue Department: A Systems Approach.

... **JUST PUBLISHED** ... *The Third Volume*
in "THE TECHNOLOGY OF MANAGEMENT" SERIES FROM SPARTAN BOOKS
AUTOMATION AND ELECTRONICS IN PUBLISHING

Edited by: LOWELL H. HATTERY and GEORGE P. BUSH

General Editor: PAUL W. HOWERTON



IBM No. 9095 6 X 9 illus. 216 pages \$8.75

AUTOMATION AND ELECTRONICS IN PUBLISHING

is the third in The American University Technology of Management series. Under the general editorship of Paul W. Howerton, these books apply the technological advances, especially in the computer and information sciences, to the broad problems of management.

Automation and Electronics is based on the results of a symposium sponsored by the University in order to explore the electronic printing automation problems and to present the various viewpoints, proposed solutions and outline for the future. It also contains a comprehensive bibliography of this new area of computer applications to the graphic arts. The editors, Doctors Lowell H. Hattery and George P. Bush are both experienced in the managerial technological sciences. They have brought together in this volume the opinions and plans of experts from the newspapers, periodicals and book publishing fields.

Publishing and printing have reached an evolutionary turning point, but as they become faster and less expensive, they become less dependent on the traditional skills and consequently require more sophisticated equipment and humans in the planning stages. The broad range of the book is illustrated by the following topics:

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- | | |
|--|---|
| ■ Chapter 1. Definition and Scope | ■ Chapter 9. Experience in Development of an Electronic Photocomposer |
| ■ Chapter 2. Electronic Computer Experience: a Daily Newspaper | ■ Chapter 10. Compatibility of Input and Output Devices |
| ■ Chapter 3. Computer Systems and Newspaper Production | ■ Chapter 11. Employee Unions and Automation |
| ■ Chapter 4. Computers and Scientific Periodicals | ■ Chapter 12. Economics of Automated Printing |
| ■ Chapter 5. Computers in Book Composition | ■ Chapter 13. A Graphic Method of Economic Feasibility Analysis |
| ■ Chapter 6. Computer Experience: Directory Production | ■ Chapter 14. Development of Lexical-Graphical Composer Printer (LGCP) Within the Air Force |
| ■ Chapter 7. Experience with the GRACE System | ■ Chapter 15. Between Here and Someday |
| ■ Chapter 8. Trends in Printing Technology | ■ Chapter 16. Topical Commentary |

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